

Confined Disposal Area 'B'

Title Page

CDF B costs have been developed without any specific design, only a concept layout which was used to develop the base footprint. General geometry and construction method are assumed similar to CDF C and where ever possible features were prorated to obtain quantities and cost. Labor rates have been updated and more recent data bases have been employed in the program. Markup is assumed the same as for CDF C. Steel piling was updated with a current supplier quotation April 2007 of \$0.65/lb. Most quantities have been linked to provide convenient adjustment capability. Link listing report should be consulted to provide further rationale for quantities and avoid erasing formulas.

The estimate for CDF C has been revised/developed according to the 90% design by foster wheeler Dated July 2001. Quantities developed by Bill McIntyre. Wage data has been updated using the latest General wage decisions dated October 6/27/2006 for 'Dredging' and 'Heavy & Marine' respectively. The estimate includes escalation of 5%, contingency of 5% and assumes a productivity of 85%. Prime contractor markup is included for FOOH, HOOH, Bond and Profit at rates of 10%, 5%, 2.75%, and 8.7% respectively.

Estimated by CENED-EP-DE

Designed by Foster-Wheeler Corp

Prepared by Christopher Lindsay, CCC

Preparation Date 12/4/2007

Effective Date of Pricing 12/4/2007

Estimated Construction Time 249 Days

New Bedford Harbor, MA

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Description	Quantity	UOM	ContractCost	OwnerMarkup	ProjectCost
Project Cost Summary Report			26,034,906	1,976,157	28,011,064
			<i>78.42</i>		<i>84.37</i>
CONFINED DISPOSAL AREA 'B', NEW BEDFORD, MA (Note: Area calculated by B. Meader from concept level plan drawing.)	332,000	SF	26,034,906	1,976,157	28,011,064
MOBILIZE AND PREPARATORY WORK	1	LS	82,311	6,708	89,019
MOB CONSTRUCTION EQUIPMENT & FAC	1	LS	10,222	833	11,055
			<i>638.86</i>		<i>690.93</i>
TRANSPORT VEHICLES OWNERSHP/OPER (Note: Considered a basic truck crew with representative equipment for 2 days tomobilize all equipment to the site.)	16	HR	10,222	833	11,055
			<i>541.55</i>	<i>8.15</i>	<i>585.68</i>
TRANSPORT VEHICLES OWNERSHP/OPER	16	HR	8,665	706	9,371
			<i>97.31</i>	<i>8.15</i>	<i>105.25</i>
HYD EXCAV, CRWLR, 57,200 LBS, 1.50 CY BKT	16	HR	1,557	127	1,684
SETUP/CONSTRUCT TEMP FACILITY	1	LS	72,089	5,875	77,964
			<i>1,287.30</i>		<i>1,392.22</i>
SETUP/CONSTRUCT TEMP FACILITY (Note: Considered a basic crew a week and a half (7 days) to set up site trailersand prepare site for CDF construction. Also added office trailer, storagetrailer, utilities, construction signs, security fencing, and toilet for thelife of the project as detail items below this title.)	56	HR	72,089	5,875	77,964
			<i>591.70</i>	<i>8.15</i>	<i>639.92</i>
SETUP/CONSTRUCT TEMP FACILITY	56	HR	33,135	2,700	35,835
			<i>212.86</i>	<i>8.15</i>	<i>230.21</i>
Office trailer, rent per month, furnished, no hookups, 32' x 8'	11	MO	2,405	196	2,601
			<i>442.92</i>	<i>8.15</i>	<i>479.02</i>
Office trailer, rent per month, furnished, no hookups, 50' x 12'	11	MO	5,005	408	5,413
			<i>132.23</i>	<i>8.15</i>	<i>143.01</i>
Office, storage boxes, 40' x 8', rent per month	11	MO	1,494	122	1,616
			<i>129.01</i>	<i>8.15</i>	<i>139.52</i>
Toilet Portable Chemical	11	MO	1,458	119	1,577
			<i>7.28</i>	<i>8.15</i>	<i>7.87</i>
Temporary Fencing, chain link, 6' high, 11 ga	800	LF	5,823	475	6,298
			<i>18.04</i>	<i>8.15</i>	<i>19.51</i>
Sign, hi-intensity reflectorized, no posts, buy	50	SF	902	73	975
			<i>1,935.11</i>	<i>8.15</i>	<i>2,092.82</i>
Utilities Water, Electric, & phone (Note: From previous estimate 1993:\$850/month)	11	MO	21,867	1,782	23,649
SITE WORK	1	LS	1,966,242	160,249	2,126,490
			<i>43.29</i>		<i>46.82</i>
FENCING	1,820	LF	78,796	6,422	85,218
			<i>43.29</i>		<i>46.82</i>
FENCING	1,820	LF	78,796	6,422	85,218

Description	Quantity	UOM	ContractCost	OwnerMarkup	ProjectCost
(Note: A 10 foot high chain link fence would be installed landside around the facility. Assumed two double gates included. Landside SSP is about 1620 LF, add 200 for site enclosure.)					
10' High Chain Link Fence	1,820	LF	78,796	6,422	85,218
			43.29		46.82
10' High Chain Link Fence	1,820	LF	74,643	6,083	80,727
(Note: Added \$1.00 for each post to material cost to adjust 8'H to 10'H fence)			41.01	8.15	44.36
Gates, swing, chain link, without barbed wire, double, galvanized, 8' high, 24 wide, excludes excavation	2	EA	4,153	338	4,491
(Note: barb wire)			2,076.51	8.15	2,245.75
RELOCATE OUTFALLS	1	LS	1,887,446	153,827	2,041,272
(Note: Several large CSOs exist within the footprint of CDF B. (ref. Dickerson memo May 5, 1998 and Final DAR rev. 2003). There exists 1-60" and 1 each 30", 48", and 2-12" outfalls to be relocated from this shoreline. A 51" x 60" conduit lies just north of the CDF footprint and is included in this project. Assume they will be routed south along Riverside Avenue. All trenches are assumed 10' deep by 8' wide. 75% of the excavated material is assumed excess and suitable for disposal as landfill cover.)					
30" RCP	1,230	LF	198,829	16,205	215,034
(Note: Placed in Riverside Avenue from Belleville to Manomet.)			161.65		174.82
Saw cutting, asphalt, over 1000', each additional inch of depth over 3"	2,460	LF	2,230	182	2,412
			0.91	8.15	0.98
Site demolition, remove bituminous pavement, 4" to 6" thick, excludes hauling and disposal fees	547	SY	7,887	643	8,530
			14.43	8.15	15.60
Excavating, trench, heavy soil, 6' to 10' deep, 1-1/4 C.Y. bucket, gradall, excludes sheeting or dewatering	1,822	BCY	2,496	203	2,699
			1.37	8.15	1.48
Backfill, 1-1/2 C.Y., sand bedding trenches, front-end loader	738	LCY	18,474	1,506	19,980
			25.03	8.15	27.07
Reinforced concrete pipe (RCP), 30" diameter, class 3, excludes excavation or backfill, gaskets	1,230	LF	105,635	8,609	114,245
			85.88	8.15	92.88
Excavating, trench backfill, 1 C.Y. bucket, 100' haul, front end loader, wheel mounted, excludes sheeting or dewatering	738	LCY	32,269	2,630	34,899
			43.73	8.15	47.29
Aggregate subbase, prepare and roll sub-base, small areas to 2500 S.Y.	547	SY	1,105	90	1,195
			2.02	8.15	2.19
Aggregate-Bituminous base course, for roadways and large paved areas, bituminous concrete, 10" thick	547	SY	20,044	1,634	21,678
			36.67	8.15	39.65
Asphaltic concrete pavement, for highways and large paved areas, binder course, 1-1/2" thick, for paving projects 300 tons or less add for trucking	547	SY	3,171	258	3,429
			5.80	8.15	6.27
Asphaltic concrete pavement, for highways and large paved areas, wearing course, 2-1/2" thick, for paving projects 300 tons or less add for trucking	547	SY	5,518	450	5,967
			10.09	8.15	10.92
54" RCP	1,230	LF	490,327	39,962	530,289
(Note: Placed in Riverside Avenue from Belleville to Manomet.)			398.64		431.13

Description	Quantity	UOM	ContractCost	OwnerMarkup	ProjectCost
Saw cutting, asphalt, over 1000', each additional inch of depth over 3"	2,460	LF	0.91 2,230	8.15 182	0.98 2,412
Site demolition, remove bituminous pavement, 4" to 6" thick, excludes hauling and disposal fees	1,093	SY	14.43 15,774	8.15 1,286	15.60 17,060
Excavating, trench, heavy soil, 6' to 10' deep, 1-1/4 C.Y. bucket, gradall, excludes sheeting or dewatering	3,644	BCY	1.37 4,992	8.15 407	1.48 5,399
Backfill, 1-1/2 C.Y., sand bedding trenches, front-end loader	1,476	LCY	25.03 36,949	8.15 3,011	27.07 39,960
Reinforced concrete pipe (RCP), 60" diameter, 8' lengths, class 3, excludes excavation or backfill, gaskets	1,230	LF	248.92 306,170	8.15 24,953	269.21 331,122
Excavating, trench backfill, 1 C.Y. bucket, 100' haul, front end loader, wheel mounted, excludes sheeting or dewatering	1,476	LCY	43.73 64,538	8.15 5,260	47.29 69,798
Aggregate subbase, prepare and roll sub-base, small areas to 2500 S.Y.	1,093	SY	2.02 2,209	8.15 180	2.19 2,389
Aggregate-Bituminous base course, for roadways and large paved areas, bituminous concrete, 10" thick	1,093	SY	36.67 40,088	8.15 3,267	39.65 43,355
Asphaltic concrete pavement, for highways and large paved areas, binder course, 1-1/2" thick, for paving projects 300 tons or less add for trucking	1,093	SY	5.80 6,342	8.15 517	6.27 6,859
Asphaltic concrete pavement, for highways and large paved areas, wearing course, 2-1/2" thick, for paving projects 300 tons or less add for trucking	1,093	SY	10.09 11,035	8.15 899	10.92 11,935
66" RCP (Note: Placed in Riverside Avenue from Manomet to Coffin Avenue.)	875	LF	398.64 348,810	28,428	431.13 377,238
Saw cutting, asphalt, over 1000', each additional inch of depth over 3"	1,750	LF	0.91 1,586	8.15 129	0.98 1,716
Site demolition, remove bituminous pavement, 4" to 6" thick, excludes hauling and disposal fees	778	SY	14.43 11,222	8.15 915	15.60 12,136
Excavating, trench, heavy soil, 6' to 10' deep, 1-1/4 C.Y. bucket, gradall, excludes sheeting or dewatering	2,593	BCY	1.37 3,551	8.15 289	1.48 3,841
Backfill, 1-1/2 C.Y., sand bedding trenches, front-end loader	1,050	LCY	25.03 26,285	8.15 2,142	27.07 28,427
Reinforced concrete pipe (RCP), 60" diameter, 8' lengths, class 3, excludes excavation or backfill, gaskets	875	LF	248.92 217,804	8.15 17,751	269.21 235,555
Excavating, trench backfill, 1 C.Y. bucket, 100' haul, front end loader, wheel mounted, excludes sheeting or dewatering	1,050	LCY	43.73 45,911	8.15 3,742	47.29 49,653
Aggregate subbase, prepare and roll sub-base, small areas to 2500 S.Y.	778	SY	2.02 1,572	8.15 128	2.19 1,700
			36.67	8.15	39.65

Description	Quantity	UOM	ContractCost	OwnerMarkup	ProjectCost
Aggregate-Bituminous base course, for roadways and large paved areas, bituminous concrete, 10" thick	778	SY	28,518	2,324	30,842
Asphaltic concrete pavement, for highways and large paved areas, binder course, 1-1/2" thick, for paving projects 300 tons or less add for trucking	778	SY	5.80 4,511	8.15 368	6.27 4,879
Asphaltic concrete pavement, for highways and large paved areas, wearing course, 2-1/2" thick, for paving projects 300 tons or less add for trucking	778	SY	10.09 7,850	8.15 640	10.92 8,490
72" RCP (Note: Placed in Riverside Avenue from Manomet to Coffin Avenue.)	1,470	LF	388.32 570,824	46,522	419.96 617,346
Saw cutting, asphalt, over 1000', each additional inch of depth over 3"	2,940	LF	0.91 2,665	8.15 217	0.98 2,882
Site demolition, remove bituminous pavement, 4" to 6" thick, excludes hauling and disposal fees	1,307	SY	14.43 18,852	8.15 1,536	15.60 20,389
Excavating, trench, heavy soil, 6' to 10' deep, 1-1/4 C.Y. bucket, gradall, excludes sheeting or dewatering	4,356	BCY	1.37 5,966	8.15 486	1.48 6,452
Backfill, 1-1/2 C.Y., sand bedding trenches, front-end loader	1,764	LCY	25.03 44,159	8.15 3,599	27.07 47,757
Reinforced concrete pipe (RCP), 60" diameter, 8' lengths, class 3, excludes excavation or backfill, gaskets	1,470	LF	248.92 365,910	8.15 29,822	269.21 395,732
Excavating, trench backfill, 1 C.Y. bucket, 100' haul, front end loader, wheel mounted, excludes sheeting or dewatering	1,764	LCY	43.73 77,131	8.15 6,286	47.29 83,417
Aggregate subbase, prepare and roll sub-base, small areas to 2500 S.Y.	1,307	SY	1.53 1,996	8.15 163	1.65 2,159
Aggregate-Bituminous base course, for roadways and large paved areas, bituminous concrete, 10" thick	1,307	SY	28.95 37,829	8.15 3,083	31.31 40,912
Asphaltic concrete pavement, for highways and large paved areas, binder course, 1-1/2" thick, for paving projects 300 tons or less add for trucking	1,307	SY	4.55 5,950	8.15 485	4.92 6,435
Asphaltic concrete pavement, for highways and large paved areas, wearing course, 2-1/2" thick, for paving projects 300 tons or less add for trucking	1,307	SY	7.93 10,366	8.15 845	8.58 11,211
Disposal of Excavated Material (Note: Excess excavated material assumed suitable will be trucked to a landfill at an estimated rate of \$40/ton to be used as cover (\$60/cy). Total Q = 4800 cy; use 75% of Q = 3600)	3,600	CY	77.40 278,655	22,710	83.71 301,366
Disposal of Excess Exc. Material	5,400	TON	51.60 278,655	8.15 22,710	55.81 301,366
SOLIDS COLLECT & CONTAINMENT	1	LS	1,369,606	111,623	1,481,229
CAPPING CONTAM AREAS/WASTE PILE (Note: Recommended Alternative Cap Area calculated from General Site Layout, 1999; by B. Meader 2007 at 299.000 sf)	7	ACR	198,493.61 1,369,606	111,623	214,670.84 1,481,229

Description	Quantity	UOM	ContractCost	OwnerMarkup	ProjectCost
TOPSOIL COVER LAYER 6" (Note: Includes grass cover)	33,396	SY	276,347	22,522	298,869
			8.27		8.95
TOPSOIL (Note: 6")	5,566	CY	258,534	21,071	279,605
			46.45		50.23
Furn & Pl Imported Topsoil (Note: Used material price from WillSand & Gravel 11/3/95 for\$15/CY delivered.)	5,566	CY	258,534	21,071	279,605
			46.45	8.15	50.23
SEEDING (Note: Assume overseed 25%)	41,745	SY	17,813	1,452	19,265
			0.43		0.46
Hydro or Air Seeding for large areas, incl. seed and (Note: fertilizer.From MEANS B.C. 1995(029 304 1000))	41,745	SY	17,813	1,452	19,265
			0.43	8.15	0.46
PROTECTION LAYER (Note: 12" Sand & Gravel)	11,132	CY	305,107	24,866	329,974
			27.41		29.64
Spread Granular Fill w/Dozer	11,132	CY	305,107	24,866	329,974
			27.41	8.15	29.64
GRANULAR DRAINAGE LAYER	33,396	SY	297,967	24,284	322,251
			8.92		9.65
Landfill gas and leachate control systems, polyethylene drainage net, geotextile fabric, heat bonded, both sides	33,396	SY	297,967	24,284	322,251
			8.92	8.15	9.65
LOW PERMEABILITY LAYER (Note: This will be a 60 mil LLDPE geomembrane underlain by a Geosynthetic Clay Liner (GCL))	33,396	SY	39,665	3,233	42,897
			1.19		1.28
Secure burial cell construction, polymeric liner and cover system, very low density polyethylene (VLDPE), 60 mil	33,396	SF	39,665	3,233	42,897
			1.19	8.15	1.28
GEOCOMPOSITE VENT LAYER (Note: High strenth, high flow geonet with a non-wovven geotextile filter bonded to both sides. includes 6" Sand/Silt subgrade layer)	33,396	SY	450,520	36,717	487,238
			13.49		14.59
Landfill gas and leachate control systems, polyethylene drainage net, geotextile fabric, heat bonded, both sides	300,564	SF	297,967	24,284	322,251
			0.99	8.15	1.07
Spread Granular Fill w/Dozer 6"	5,566	CY	152,554	12,433	164,987
LIQ/SED/SLUDGES COLLECT-CONTAIN	1	LS	22,573,140	1,694,023	24,267,163
			27.41	8.15	29.64
DREDGING/EXCAVATING (Note: Includes material dredged to construct the 1/2 dike outside of the sheetpile wall.)	47,073	CY	10,097,173	677,232	10,774,405
			214.50		228.89

Description	Quantity	UOM	ContractCost	OwnerMarkup	ProjectCost
			214.50		228.89
DREDGING THE 1/2 DIKE FOOTPRINT (Outside of Sheetpile Wall)	47,073	CY	10,097,173	677,232	10,774,405
(Note: Dredging less contaminated (< 10 ppm PCB) material outside the wall, placing it inside the CDF wall in a single motion and stockpiling on shore using a dozer. Assume 25% of the material will be contaminated (> 10 ppm PCB) and will be dewatered and T&D offsite at a cost of \$500/cy.)					
			393.01		412.66
Contaminated Dredged Material	11,768	CY	4,625,000	231,250	4,856,250
(Note: 25% of material from outside the wall. assumed handled as other material in the harbor at the historic cost of about \$500/cy including markup.)					
Dredging Contaminated Material	9,250	CY	4,625,000	231,250	4,856,250
(Note: Historic Price Assumed including all markup.)					
			155.00		167.63
Dredging Less-Contaminated Material	35,304	CY	5,472,173	445,982	5,918,155
(Note: 75% of the material from outside the wall. Eventually the material will be moved using a dozer, then loaded onto trucks for disposal at a landfill.)					
			791.50	8.15	856.01
BARGE MTD CLAMSHELL, 15 CY NON DREDGE,150T,150'B,200'X75X15	740	HR	585,714	47,736	633,449
			4.80	8.15	5.20
WORK BARGE-S,MED DUTY,60'X16'X5'	740	HR	3,555	290	3,845
			300.47	8.15	324.96
TUG BOAT, 150 - 400HP (112 - 298KW)	740	HR	222,349	18,121	240,471
			99.19	8.15	107.27
Clamshell Dredge- Operator	740	HR	73,397	5,982	79,379
			69.21	8.15	74.85
Clamshell Dredge- Mate	740	HR	51,217	4,174	55,391
			76.01	8.15	82.21
Clamshell Dredge- Engineer	740	HR	56,250	4,584	60,834
			58.70	8.15	63.49
Clamshell Dredge- Deckhand -2	1,480	HR	86,878	7,081	93,958
			66.95	8.15	72.40
Clamshell Dredge- Welder	740	HR	49,540	4,038	53,578
			75.70	8.15	81.87
Tugs/Tending- Tug Master	740	HR	56,018	4,565	60,584
			69.21	8.15	74.85
Tugs/Tending- Tug Mate	740	HR	51,217	4,174	55,391
			76.01	8.15	82.21
Tugs/Tending- Engineer	740	HR	56,250	4,584	60,834
			58.70	8.15	63.49
Tugs/Tending- Deckhand	740	HR	43,439	3,540	46,979
			97.64	8.15	105.59
T&D waste excess excavated materials to landfill	42,365	LCY	4,136,350	337,113	4,473,462
(Note: Includes 75% of total with allowance of 20% for swell. Assume \$100/cy)					

Description	Quantity	UOM	ContractCost	OwnerMarkup	ProjectCost
LAGOONS/BASINS/TANKS/DIKES (Note: Area calculated by B. Meader.)	332,000	SF	12,475,967	1,016,791	13,492,758
			37.58		40.64
OFFSHORE BERM (Note: Steel sheet pile (AZ 36) with timber lagging and grouted interior side. Outside will be half-dike with crushed rock, processed gravel and riprap and a vegetated upper slope.)	1,860	LF	10,688,744	871,133	11,559,876
			5,746.64		6,214.99
WALL	1,860	LF	5,982,025	487,535	6,469,560
			3,216.14		3,478.26
AZ36 Sheetpile and Soldier Columns (Note: Includes 480 LF @ 54' and 982 LF @ 49' = 1470 tons Also includes Soldier Piles W10 X 30 to support the sheetpile and hold the timber lagging: 365 pieces @ 20'L = 107 tons)	1,584	TON	5,143,223	419,173	5,562,395
			3,246.98		3,511.61
AZ 39 Sheet piling, steel, 39 psf, 40' +/- excavation, left in place, excludes wales	1,871	TON	4,746,750	386,860	5,133,610
			2,536.89	8.15	2,743.64
Piles, steel, 20' long, W10 x 30, excludes mobilization or demobilization (Note: Modified cost from H section 8 X 36. Used material costs from Means 2006. Project requires 355 piles 20' long at 4' O.C....about 107 tons)	9,300	VLF	396,473	32,313	428,785
			42.63	8.15	46.11
Timber Lagging (Note: 3,240 pieces 3" x 6" x 4'. Total quantity in 19,440 BF, add 10% for waste = 21,384 bf)	27,226	BF	110,520	9,007	119,527
			4.06		4.39
3" x6" wood column framing, heavy mill timber, structural grade, 1500f (Note: 3,240 pieces 3" x 6" x 4'. Total quantity in 19,440 BF, add 10% for waste = 21,384 bf)	27,226	BF	110,520	9,007	119,527
			4.06	8.15	4.39
Grout (Note: Assume a concrete flowable fill at \$125/cy)	3,499	CY	728,282	59,355	787,637
			208.16		225.13
Slurry wall installation, soil, bentonite backfill mixing per cubic yard (Note: The annular space between the sheetpile and the lagging will be filled with bentonite grout. Material cost assumed \$125/cy, no references available.)	3,499	CY	728,282	59,355	787,637
			208.16	8.15	225.13
BERM	1,860	LF	4,706,719	383,598	5,090,316
			2,530.49		2,736.73
Crushed Rock (Note: Major fill material outside wall. MHD data base indicates \$30/cy for normal projects. Assume construction will begin at a shore end and extended as material is delivered via 25 cy haulers. A dozer will spread and grade the areas above water and a hydraulic excavator will grade the water side material with a smooth bucket. Assume the dozer can spread 200 cy/hr and the hydraulic excavator will need only half that to grade the slope.)	113,228	CY	4,348,416	354,396	4,702,812
			38.40		41.53
TRACTOR, CRAWLER (DOZER), 136-180 HP (101-134KW), POWERSHIFT (W/UNIVERSAL BLADE)	566	HR	72,127	5,878	78,006
			127.40	8.15	137.78
Crushed Stone delivered to site	113,228	CY	4,113,305	335,234	4,448,540
			36.33	8.15	39.29
4 laborer + 1 1.5 Cy Hydr. Excavator, Cwlr	286	HR	162,983	13,283	176,266
			569.37	8.15	615.77

Description	Quantity	UOM	ContractCost	OwnerMarkup	ProjectCost
Gravel Fill (Note: Well graded sand & gravel over the top of the berm including road bed.)	4,453	CY	164,213	13,383	177,597
			36.88		39.88
Fill, gravel, for embankments, 1 mile haul, spread, by dozer (Note: Gravel is well graded and compacted. and includes the roadway surface.)	5,121	LCY	150,859	12,295	163,153
			29.46	8.15	31.86
Rough grading, open site, small area, 75 H.P., dozer	4,453	BCY	7,246	591	7,836
			1.63	8.15	1.76
Aggregate subbase, prepare and roll sub-base, small areas to 2500 S.Y. (Note: for roadway on dike, 12' w x 1515' l = 18180 sf = 2020 sy)	2,570	SY	6,109	498	6,607
			2.38	8.15	2.57
RipRap (Note: Assumed dumped from trucks using the gravel road on the dike, and graded with a hydraulic excavator)	2,672	CY	160,535	13,084	173,618
			60.09		64.98
Rip-rap, random pieces, dumped from truck, 50 - 1000 pound pieces (Note: Estimated quantity is 2,100 CY. Included 10% for loss and waste.)	2,939	LCY	160,535	13,084	173,618
			54.62	8.15	59.08
Clay Fill from Dredging	1,399	CY	17,304	1,410	18,714
			12.36		13.37
Backfill, waste excess excavated materials on site (Note: Allow 25% for swell.)	1,679	LCY	4,618	376	4,994
			2.75	8.15	2.97
Barge, Tugboat, Operator and 2 Laborers	20	HR	12,686	1,034	13,720
			623.22	8.15	674.01
Vegetation of upper slope	1	EA	16,252	1,325	17,576
			16,251.77		17,576.29
Allowance for vegetation	1	LS	16,252	1,325	17,576
			16,252		17,576
SHORELINE BERM (Note: This berm will be constructed of imported granular fill in horizontal lifts with a 60 mil HDPE liner on the inside slope. Site demolition will include intake structures, pipelines, timber bulkheads, a boat rail, and several old foundations and the site will be excavated to a level of -1.0'.)	1,620	LF	615,451	50,159	665,610
			379.91		410.87
Common Borrow	20,681	CY	414,424	33,776	448,200
			20.04		21.67
Backfill, dumped gravel or fill, 6" layers, spread, dozer (Note: MHD AVG COST \$20/CY IN PLACE)	20,681	LCY	414,424	33,776	448,200
			20.04	8.15	21.67
Gravel Base for Road	483	CY	9,670	788	10,458
			20.04		21.67
Backfill, dumped gravel or fill, 6" layers, spread, dozer	483	LCY	9,670	788	10,458
			20.04	8.15	21.67
			54.90		59.37

Description		Quantity	UOM	ContractCost	OwnerMarkup	ProjectCost
Sand on Berm		1,654	LF	90,826	7,402	98,228
				20.27		21.92
Bedding Sand 12"		2,275	CY	46,111	3,758	49,869
(Note: Volume = 1200 lf x 35 lf x 1' t /27 = 1557, say 1650 cy)						
Spread Granular Fill w/Dozer		2,275	CY	46,111	3,758	49,869
				20.27		21.92
Cover Sand 12"		2,206	CY	44,714	3,644	48,358
				20.27		21.92
Spread Granular Fill w/Dozer		2,206	CY	44,714	3,644	48,358
(Note: mhd AVG COST)						
				1.30		1.41
Geomembrane Liner		77,209	SF	100,531	8,193	108,724
				1.30		1.41
Membrane lining systems, HDPE, 100,000 S.F. or more, 60 mil thick		77,209	SF	100,531	8,193	108,724
(Note: This accounts for the membrane under the shoreline berm only, however it is contiguous with the membrane on the base of the CDF which is included under 'Base Fills and Liners'. All seams will be 'hot shoe fusion' or 'extrusion welding' and will run down slopes (not across). It is assumed the the liner over the berm will be placed using a spreader bar assembly attached to a loader bucket.)						
				35.09		37.95
BASE FILLS AND LINERS		33,396	SY	1,171,772	95,499	1,267,272
(Note: It is expected that woking directly on the base of the CDF with heavy equipment will not be feasible due to the soft wet sediment. The geomembrane on the shoreline berm may be placed conventionally with a spreader bar and loader. The remaining areas will require the use floating plant to install liners. A 50 ton crane mounted on a deck barge with a winch system will be used to handle rolls of liner material. This support crew has been included in 'geomembrane' item entirely., but its use on the 'geotextile' is assued as well.)						
				37.36		40.40
GeoMembrane Liner		15,716	SY	587,120	47,850	634,970
				1.99		2.15
Membrane lining systems, HDPE, 100,000 S.F. or more, 60 mil thick		169,730	SF	337,468	27,504	364,972
(Note: Used premium cost for material: \$1.00/sf. Added 20% for waste and overlap.)						
				29.85		32.28
WORK BARGE, FLAT DECK , 1000 TON APPROX. 100'x 40'x 9',WOOD DECK		471	HR	14,072	1,147	15,219
(Note: Assume 60 days at 8 hours/day)						
				179.49		194.11
CRANES, HYDRAULIC, SELF-PROPELLED, ROUGH TERRAIN, 50 TON, 110' BOOM, 4X4		236	HR	42,311	3,448	45,760
(Note: Assume 30 days @ 8hr/day)						
				60.52		65.46
MARINE EQUIPMENT, BOATS & LAUNCHES, 18' (5.5 M) LONG, R-RUNNER V-HULL, 1,350 LBS (612 KG), NO CABIN, OUTBOARD ENGINE		943	HR	57,072	4,651	61,723
(Note: 2 boats for 60 days)						
				120.46		130.27
Clamshell Dredge- Operator		236	HR	28,396	2,314	30,710
				120.46		130.27
Clamshell Dredge- Operator		236	HR	28,396	2,314	30,710

Description	Quantity	UOM	ContractCost	OwnerMarkup	ProjectCost
Tugs/Tending- Tug Mate (Note: 2 men to operate launches for 60 days)	943	HR	84.21 79,405	8.15 6,472	91.07 85,876
GeoTextile Liner	17,680	SY	78,308	6,382	84,691
Drainage geotextiles, non-woven polypropylene, 60 mils thick (Note: Add 20% for waste and overlap.)	21,216	SY	4.43 78,308	8.15 6,382	4.79 84,691
Pumped Sand (Note: Sand slurry ppumped into facility to level bottom.)	5,893	CY	155,714	12,691	168,404
Slurry wall installation, normal soil, 26' - 75' excavation (Note: Assumed MHD avg cost for material in place is \$20/cy Pumping cost added.)	5,893	CY	26.42 155,714	8.15 12,691	28.58 168,404
Cover Sand	16,698	CY	338,463	27,585	366,048
Spread Granular Fill w/Dozer (Note: mhd AVG COST)	16,698	CY	20.27 338,463	8.15 27,585	21.92 366,048
Control of Water (Note: Place holder for expected dewatering effort. Actual task is not defined.)	1	LS	12,167	992	13,159
Dewatering, sump hole construction, pit with gravel collar, corrugated, 12" gravel collar, 15" corr. pipe, 16 ga, includes excavation and gravel pit	200	LF	60.83 12,167	8.15 992	65.79 13,159
DEMOBILIZATION	1	LS	43,608	3,554	47,162
REMOVAL OF TEMPORARY FACILITIES	1	LS	18,053	1,471	19,525
REMOVAL OF TEMPORARY FACILITIES (Note: Assumed a basic crew for 5 days to take down trailers and put finishingtouches on the site before mobilizing the equipment.)	40	HR	18,053	1,471	19,525
REMOVAL OF TEMPORARY FACILITIES	40	HR	451.33 18,053	8.15 1,471	488.12 19,525
DEMOB OF CONSTRUCTION EQUIP/FACL	1	LS	25,554	2,083	27,637
TRANSPORT VEHICLES OWNRSHP/OPN (Note: Assumed a basic truck crew and representative equipment for 5 days to mobilze all equipment from the site.)	40	HR	25,554	2,083	27,637
TRANSPORT VEHICLES OWNRSHP/OPN	40	HR	638.86 25,554	8.15 2,083	690.93 27,637